Nursing management of patient with anemia

Definition of anemia: Is a condition in which the hemoglobin concentration is lower than normal; it reflects the presence of fewer than the normal number of erythrocytes within the circulation.

- As a result, the amount of oxygen delivered to body tissues is also diminished.
- Anemia is not a specific disease state but a sign of an underlying disorder.
- It is by far the most common hematologic condition.

Classification of anemia by cause:

A. **Hypo-proliferative:** Resulting from Defective RBC Production Inadequate production of erythrocytes may result from marrow damage due to:

- Medications: e.g. chloramphenicol or chemicals e.g. benzene
- Lack of factors: e.g. iron, vitamin B12, folic acid or erythropoietin
- Cancer/inflammation

B. **Bleeding:** Resulting from RBC Loss.

- Bleeding from gastrointestinal tract, epistaxis (nosebleed),
- Trauma,
- Bleeding from genitourinary tract (e.g. menorrhagia: excessive menstrual bleeding)

C. **Hemolytic:** Resulting from RBC Destruction. Altered erythropoiesis: e.g. sickle cell anemia, thalassemia, Hypersplenism (hemolysis), Drug-induced anemia.

Different types of anemia:

1. Iron deficiency anemia
2. Anemias in renal disease

3. Anemia of chronic disease
4. Aplastic anemia
5. Megaloblastic anemias
   A. Folic acid deficiency
   B. Vitamin B12 deficiency
6. Hemolytic anemias:
   A. Sickle cell anemia
   B . Thalassemia

1. Iron deficiency anemia:

- Typically results when the intake of dietary iron is inadequate for hemoglobin synthesis.
- Iron deficiency anemia is the most common type of anemia in all age groups, and it is the most common anemia in the world.

Causes:

- **Bleeding** from ulcers, gastritis, inflammatory bowel disease, or GI tumors (The most common cause of iron deficiency anemia in men and postmenopausal women).
- **Menorrhagia** (i.e., excessive menstrual bleeding) **and pregnancy** with inadequate iron supplementation (The most common causes of iron deficiency anemia in premenopausal women).
- Patients with chronic alcoholism often have chronic blood loss from the GI tract, which causes iron loss and eventual anemia.
- A lack of iron in diet
- Iron malabsorption, as is seen after gastrectomy or with celiac disease.

2. **Anemias in renal disease:** This anemia is caused by both:

- A mild shortening of erythrocyte lifespan
- A deficiency of erythropoietin (necessary for erythropoiesis).

- The degree of anemia in patients with end-stage renal disease varies greatly.
- In general patients do not become significantly anemic until the serum creatinine level exceeds 3 mg/100 mL.
- Patients who receive hemodialysis are liable to have iron and folate deficiency.
- Erythropoietin e.g. epoetin alfa [Epogen] in combination with oral iron supplements, has dramatically altered the management of anemia in end-stage renal disease by decreasing the need for RBC transfusion, with its associated risks.

3. **Anemia of chronic disease:** May be caused by Chronic diseases of:

- Inflammation e.g. Rheumatoid arthritis
- Chronic infection
- Malignancy cause this type of anemia.
- It develops gradually over 6 to 8 weeks
- The anemia is usually mild to moderate and nonprogressive.
- Most of these patients have few symptoms and do not require treatment for the anemia.
- These patients do not benefit from additional iron supplementation.
- Treatment of the underlying disorder is required

4. **Aplastic anemia:** is a rare disease caused by a decrease in or damage to marrow stem cells, damage to the microenvironment within the marrow, and replacement of the marrow with fat resulting in bone marrow aplasia (i.e., markedly reduced hematopoiesis). It is presumed that:

- The lymphocytes of patients with aplastic anemia destroy the stem cells and consequently impair the production of erythrocytes, leukocytes, and platelets.
- Severe anemia,

- Significant neutropenia (a neutrophil count of less than 2000/mm3)
- Thrombocytopenia (ie, a deficiency of platelets) also occur.
- Aplastic anemia can be congenital or acquired, but most cases are idiopathic (The precise etiology is unknown).

Other factors:

- Radiation and chemotherapy treatments (a temporary side effect of these treatments).
- Exposure to toxic chemicals: such as some used in pesticides, insecticides, benzene.
- Viral infections e.g. hepatitis, HIV
- Use of some prescription drugs: such as chloramphenicol
- Pregnancy (rarely)
- The disease can be managed with:
- Transfusions of PRBCS and platelets as necessary.
- Immunosuppressive therapy
- Bone marrow transplant.

5. **MEGALOBLASTIC ANEMIAS**: Is the anemias caused by deficiencies of vitamin B12 or folic acid. In either anemia, the erythrocytes that are produced are abnormally large and are called megaloblastic red cells.

A. **Folic Acid Deficiency:**

- Folic acid is stored as compounds referred to as folates.
- The folate stores in the body are much smaller than those of vitamin B12, and they are quickly depleted when the dietary intake of folate is deficient (within 4 months).
- Folate is found in green vegetables and liver.
- Folic acid requirements are also increased in:
  - ✓ Patients with alcoholism
  - ✓ Patients with chronic hemolytic anemias
  - ✓ In women who are pregnant

- ✓ Patients with malabsorptive diseases of the small bowel e.g. Celiac disease, Crohn's disease

- Folate deficiency is treated by increasing the amount of folic acid in the diet and administering folic acid supplement daily.
- Folic acid is administered intramuscularly only to people with malabsorption problems.

B. **Vitamin B12 Deficiency:** A deficiency of vitamin B12 can occur in several ways:

- Inadequate dietary intake is rare but can develop in strict vegetarians who consume no meat or dairy products.
- Faulty absorption from the GI tract is more common. This occurs in conditions such as Crohn's disease, or after ileal resection or gastrectomy.
- Absence of intrinsic factor, as in pernicious anemia.
- Vitamin B12 deficiency is treated by vitamin B12 replacement (oral supplements & IM injections)

6. Hemolytic Anemias:

- In hemolytic anemias, the erythrocytes have a shortened lifespan; thus, their number in the circulation is reduced.
- Inherited forms: e.g. sickle cell anemia, thalassemia
- Acquired forms: e.g. anemias associated with hypersplenism (an overactive spleen)

A. Sickle cell anemia:

- is a severe hemolytic anemia that results from inheritance of the sickle hemoglobin gene.
- This gene causes the hemoglobin molecule to be defective.
- Sickled cells are rapidly hemolyzed and thus have a very short life span (10 to 12 days).

- These long, rigid erythrocytes can adhere to the endothelium of small vessels; when they adhere to each other, blood flow to a region or an organ may be reduced.
- Symptoms and complications result from chronic hemolysis or thrombosis; the primary sites involve those areas with slower circulation, such as the spleen, lungs, and central nervous system.
- Cold can aggravate the sickling process, because vasoconstriction slows the blood flow.
- Patients with sickle cell anemia are usually diagnosed in childhood.

B . Thalassemia: A group of hereditary anemias characterized by:

- Hypochromia (an abnormal decrease in the hemoglobin content of erythrocytes),
- Extreme microcytosis (smaller-than-normal erythrocytes),
- Destruction of blood elements (hemolysis), and variable degrees of anemia.
- Classified into two major groups according to which hemoglobin chain is diminished:

  - **Alpha-thalassemias;** are milder than the beta forms and often occur without symptoms; the erythrocytes are extremely microcytic, but the anemia, if present, is mild.
  - **Beta thalassemias:** The severity of beta-thalassemia varies depending on the extent to which the hemoglobin chains are affected.

- Patients with mild forms have microcytosis and mild anemia. If left untreated, severe beta-thalassemia (i.e., thalassemia major: is characterized by severe anemia, marked hemolysis, and ineffective erythropoiesis).
- The disease is usually treated with transfusion of PRBCs. Bone marrow transplantation offers a chance of cure

Clinical Manifestations of anemia: Several factors influence the development of anemia-associated symptoms:

- The rapidity with which the anemia has developed
- The duration of the anemia (i.e., its chronicity),
- The metabolic requirements of the patient,
- Other concurrent disorders or disabilities (e.g., cardiac or pulmonary disease),
- Complications or concomitant features of the condition that produced the anemia.
- In general, the more rapidly an anemia develops, the more severe its symptoms.
- Healthy person can often tolerate as much as a 50% gradual reduction in hemoglobin without pronounced symptoms or significant.
- The rapid loss of as little as 30% may precipitate profound vascular collapse in the same person.
- People who customarily are very active or who have significant demands on their lives are more likely to have symptoms, and those symptoms are more likely to be pronounced than in more sedentary people.
- Patients with hypothyroidism with decreased oxygen needs may be completely asymptomatic.
- Patients with coexistent cardiac, vascular, or pulmonary disease may develop more pronounced symptoms of anemia (e.g., dyspnea, chest pain, muscle pain or cramping) at a higher hemoglobin level than those without these concurrent health problems.

Common clinical manifestations of anemia (all types of anemias):

- Weakness, fatigue, and general malaise are common. The most common symptom of anemia is fatigue.
- Tachycardia, Palpitations & Exertional dyspnea

- Headache & poor concentration
- Pallor of the skin and mucous membranes (conjunctivae, oral mucosa).

Iron deficiency anemia:

- Ridged nails
- Brittle nails
- Spoon-shaped nails: The middle of the nail dips and the edges are raised to give a rounded appearance like a spoon
- Angular cheilosis (corners of the mouth may be ulcerated)
- Smooth, sore tongue
- Crave ice or dirt; this craving is known as pica.

Megaloblastic anemia:

- The neurologic manifestations of vitamin B12 deficiency do not occur with folic acid deficiency, and they persist if vitamin B12 is not replaced.
- Onset and progression of the anemia are so gradual
- A smooth, sore, red tongue, angular cheilosis and mild diarrhea.
- They are extremely pale, particularly in the mucous membranes.
- Jaundice may be present
- They may become confused; more often they have paresthesias in the extremities (particularly numbness and tingling in the feet and lower legs).
- They may have difficulty maintaining their balance

Aplastic anemia:

- Patients with aplastic anemia are vulnerable to problems related to erythrocyte, leukocyte, and platelet deficiencies.
- They should be assessed carefully for signs of infection and bleeding e.g. throat infections, cervical lymphadenopathy, Purpura (bruising), Retinal hemorrhages...etc.

Sickle cell anemia:

- Painful sickle cell crises (acute pain episodes tend to be self-limited, lasting hours to days), Aspirin, NSAIDS
- Jaundice is characteristic and is usually obvious in the sclerae.
- Susceptibility to infection, particularly pneumonia and osteomyelitis may occur.

Medical Management of anemia:

- Management of anemia is directed toward correcting or controlling the cause of the anemia;
- If the anemia is severe, the erythrocytes that are lost or destroyed may be replaced with a transfusion of packed red blood cells (PRBCs).

General complications of severe anemia include:

- Angina and Heart failure
- Paresthesias
- Confusion

Nursing interventions

A.general nursing interventions:

Goals of care:

- Managing fatigue
- Maintaining adequate nutrition
- Promoting compliance with prescribed therapy
- Maintaining adequate perfusion
- Monitor and manage of potential complications

Managing Fatigue

- Assisting the patient to prioritize activities
- to establish a balance between activity and rest that is acceptable to the patient.

- Patients with chronic anemia need to maintain some physical activity and exercise to prevent risks of inactivity.

Maintaining Adequate Nutrition

- A healthy diet should be encouraged
- mouth and tongue soreness may limit nutritional intake, advise patient to eat small amounts of bland, soft foods frequently.
- Dietary teaching sessions should be individualized, involve family members, and include cultural aspects related to food preferences and food preparation.
- Dietary supplements (e.g., vitamins, iron, folate, protein) may be prescribed.
- The patient and family must understand the role of nutritional supplements in the proper context, because many forms of anemia are not the result of a nutritional deficiency.
- Ongoing medical follow-up and screening are important.

Promoting Compliance with Prescribed Therapy: Patients need to understand:

- The purpose of the medication,
- How to take the medication and over what time period,
- How to manage any side effects of therapy.

Maintaining Adequate Perfusion

- Lost volume is replaced with
- transfusions or intravenous (IV) fluids,
- Based on symptoms and laboratory test results.
- Supplemental oxygen may be necessary, but it is rarely needed on a long-term basis unless there is underlying severe cardiac or pulmonary disease.
- Monitor the patient's vital signs and pulse oximeter readings closely.

- Other medications, such as antihypertensive agents, may need to be adjusted or withheld.

Monitor and manage of potential complications: Expected Patient Outcomes: Absence of complications

- Avoids or limits activities that cause dyspnea, palpitations, dizziness, or tachycardia
- Uses rest and comfort measures to alleviate dyspnea
- Has vital signs within baseline for patient
- Has no signs of increasing fluid retention (eg, peripheral edema, decreased urine output, neck vein distention)
- Remains oriented to time, place, and situation
- Ambulates safely, using assistive devices as necessary
- Remains free of injury
- Verbalizes understanding of importance of serial CBC measurements
- Maintains safe home environment; obtains assistance as necessary

Nursing Interventions for IRON DEFICIENCY ANEMIA

- Preventive education is important, because iron deficiency anemia is common in menstruating and pregnant women.
- Food sources high in iron include:

✓ Organ meats (e.g., Beef or chicken liver),
✓ Other meats,
✓ Beans,
✓ Leafy green vegetables,
✓ Raisins
✓ Molasses.

- Patients with strict vegetarian diets are counseled that such diets often contain inadequate amounts of absorbable iron.
- Nutritional counseling can be provided for those whose usual diet is inadequate.

- Taking iron-rich foods with a source of vitamin C (e.g., orange juice) enhances the absorption of iron.
- Iron store replenishment takes much longer, so it is important that the patient continue taking the iron for as long as 6 to 12 months.
- Iron supplements are usually given in the oral form,
- Several oral iron preparations: ferrous sulfate, ferrous gluconate, and ferrous fumarate
- Many patients have difficulty tolerating iron supplements because of GI side effects (primarily constipation, but also cramping, nausea, and vomiting).
- Give patient education for taking oral iron supplements as following:

✓ Take iron on an empty stomach (1 hour before or 2 hours after a meal).

✓ Iron absorption is reduced with food (diminishes iron absorption by as much as 50%)

✓ Avoid taking iron supplements with: milk, caffeine, antacids, calcium supplements because they greatly diminish its absorption.

✓ Increase the intake of vitamin C to enhance iron absorption. e.g. citrus fruits and juices, strawberries, tomatoes, broccoli

✓ Eat foods high in fiber to minimize problems with constipation

✓ Remember that stools will become dark in color

✓ use a straw or place a spoon at the back of the mouth to take the supplement to prevent staining the teeth with a liquid preparation (less GI distress). Rinse the mouth thoroughly afterward and Practice good oral hygiene after taking this medication

- **The IV route** is preferred when oral administration is not possible. IV supplementation may be used when :
  - ❖ If oral iron is poorly absorbed or poorly tolerated, or iron supplementation is needed in large amounts

- A small test dose should be administered parenterally to avoid the risk of anaphylaxis
- Emergency medications (e.g., epinephrine) should be close at hand.
- If no signs of allergic reaction have occurred after 30 minutes, the remaining dose of iron may be administered.
- Several doses are required to replenish the patient's iron stores

IM **administration** of iron causes some local pain and possibly staining the skin

- Because of the problems with IM administration, the IV route is preferred when oral administration is not possible
- These side effects are minimized by using the Z-track technique for administering iron dextran deep into the gluteus maximus muscle.
- The nurse avoids rubbing the injection site after the injection.